



# 56F8365

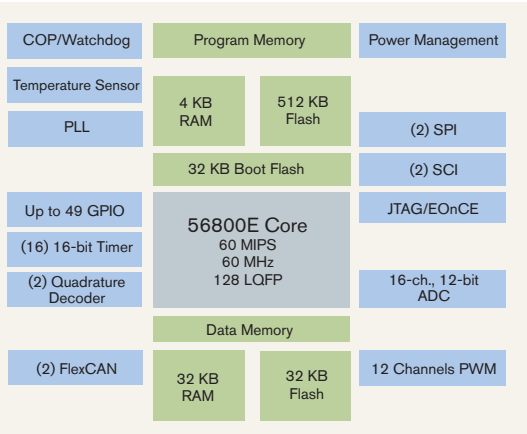
### Target Applications

- > Automotive control
- > Industrial control/ connectivity
- > Advanced motion control
- > Home appliances
- > General-purpose inverters
- > Smart relays
- > Fire and security systems
- > Power management
- > Medical monitoring
- > Multiphase inverters

### Overview

56F8365 designers subscribe to the philosophy that you can never have enough of a good thing. That is why they added more on-chip Flash memory (up to 576 KB), pulse-width modulation (PWM) outputs, analog-to-digital converter (ADC) inputs, timer channels and quadrature decoders to the peripherals found in smaller members of the device family.

With these additions, a whole new set of applications can now benefit from the hybrid microcontroller (MCU)/DSP capabilities of the 56800E architecture. Imagine adding signal processing capabilities to a smart user interface, or adding a sophisticated communication protocol to an industrial control application. The possibilities are endless, especially when you consider that you can have access to all these advanced features at extreme temperatures.



### 56800E Core Features

- > Up to 60 MIPS at 60 MHz execution frequency
- > DSP and MCU functionality in a unified, C-efficient architecture
- > JTAG/enhanced on-chip emulation (EOnCE™) for unobtrusive, real-time debugging
- > Four 36-bit accumulators
- > 16- and 32-bit bidirectional barrel shifter
- > Parallel instruction set with unique addressing modes
- > Hardware DO and REP loops available
- > Three internal address buses
- > Four internal data buses
- > Architectural support for 8-, 16- and 32-bit single-cycle data fetches
- > MCU-style software stack support
- > Controller-style addressing modes and instructions
- > Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)
- > Proven to deliver more control functionality with a smaller memory footprint than competing architectures

### Benefits

- > Hybrid architecture facilitates implementation of both control and signal processing functions in a single device
- > High-performance, secured Flash memory eliminates the need for external storage devices
- > Extended temperature range up to +125°C allows for operation of nonvolatile memory in harsh environments
- > Flash memory emulation of EEPROM eliminates the need for external nonvolatile memory
- > 32-bit performance with 16-bit code density
- > On-chip voltage regulator and power management reduce overall system cost
- > Diversity of peripheral configuration facilitates the elimination of external components, improving system integration and reliability
- > This device boots directly from Flash, providing additional application flexibility
- > High-performance PWM with programmable fault capability simplifies design and promotes compliance with safety regulations
- > PWM and ADC modules are tightly coupled to reduce processing overhead
- > Low-voltage interrupts (LVIs) protect the system from brownout or power failure
- > Simple in-application Flash memory programming via EOnCE or serial communication

### Memory Features

- > Architecture permits as many as three simultaneous accesses to program and data memory
- > On-chip memory includes high-speed volatile and nonvolatile components
  - 512 KB of Program Flash
  - 4 KB of Program RAM
  - 32 KB of Data Flash
  - 32 KB of Data RAM
  - 32 KB of Boot Flash
- > All memories operate at 60 MHz (zero wait states) over temperature range (-40°C to +125°C), with no software tricks or hardware accelerators required
- > Flash security feature prevents unauthorized accesses to its content

### 56F8365 Peripheral Circuit Features

- > Two PWM modules with 12 outputs and eight programmable fault inputs
- > Two serial peripheral interfaces (SPIs)
- > Two serial communications interfaces (SCIs)
- > I<sup>2</sup>C communications master mode (emulated)
- > Sixteen 16-bit timers with input and output compare capability
- > Two four-input quadrature decoders
- > Two FlexCAN modules, 2.0 B-compatible
- > Temperature sense diode to monitor the on-chip temperature
- > On-chip 3.3V to 2.6V voltage regulator
- > Software-programmable Phase-Lock Loop (PLL)
- > 12-bit ADCs with 16 inputs, self-calibration and current injection capability
- > Up to 49 general-purpose input/output (GPIO) pins
- > External reset input pin for hardware reset
- > Computer operating properly (COP)
- > Integrated power-on reset and LVI module

### Award-Winning Development Environment

- > Processor Expert™ (PE) technology provides a rapid application design (RAD) tool that combines easy-to-use, component-based software application creation with an expert knowledge system.
- > The CodeWarrior™ Integrated Development Environment (IDE) is a sophisticated tool for code navigation, compiling and debugging. A complete set of evaluation modules (EVMs) and development system cards will support concurrent engineering. Together, PE technology, CodeWarrior tools and EVMs create a complete, scalable tools solution for easy, fast and efficient development.

### Product Documentation

<b>56F8300 Peripherals Manual</b>	Detailed peripheral description of the 56F8300 family of devices <b>Order Number:</b> MC56F8300UM
<b>56F8365/ 56F8165 Technical Data Sheet</b>	Electrical and timing specifications, device-specific peripheral information and package and pin descriptions <b>Order Number:</b> MC56F8365
<b>56F8365 Product Brief</b>	Summary description and block diagram of the core, memory, peripherals and interfaces <b>Order Number:</b> MC56F8365PB
<b>DSP56800E Reference Manual</b>	Detailed description of the DSP56800E architecture, 16-bit core processor and the instruction set <b>Order Number:</b> DSP56800ERM

### Ordering Information

<b>Part</b>	MC56F8365
<b>Package Type</b>	Low-Profile Quad Flat Pack (LQFP)
<b>Pin Count</b>	128
<b>Temperature Range</b>	-40°C to +125°C
<b>Order Number</b>	MC56F8365MFG60

<b>Part</b>	MC56F8365
<b>Package Type</b>	Low-Profile Quad Flat Pack (LQFP)
<b>Pin Count</b>	128
<b>Temperature Range</b>	-40°C to +105°C
<b>Order Number</b>	MC56F8365VFG60

**Learn More:** For more information about Freescale products, please visit [www.freescale.com](http://www.freescale.com).